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The Reptiles of West Gippsland

By P. A. Rawlinson*

INTRODUCTION

Gippsland is included in Spencer's (1896) Bassian zoogeographic subregion as modified by Serventy and Whittell (1951). Rawlinson (1969) has attempted to show that the reptile fauna of East Gippsland is Bassian in nature and the present account of the reptiles of West Gippsland is intended to complement that of East Gippsland. It should be noted that there is an area of Gippsland (lying between Stratford and 148°E. long.) not covered by these two accounts.

The Bassian subregion lies within the temperate zone and it includes the highest latitudes and altitudes found in Australia. Environmental temperatures decrease with an increase in latitude or altitude; thus temperatures in the Bassian are generally lower than those prevailing elsewhere in Australia. It is possible to recognize three thermal zones within the Bassian, each of which appears to have a characteristic reptile fauna (Rawlinson 1969 and unpublished):

1. *Warm temperate zone*: Coastal plains of E. New South Wales and E. Victoria; inland margins of the Eastern Highlands; the coastal and volcanic plains of SW. Victoria; and the coastal plains and Mt. Lofty Ranges in SE. South Australia.
2. *Cool temperate zone*: Eastern Highlands in New South Wales and Victoria, including the Southern Uplands; the Bass Strait islands; N. and E. Tasmania.
3. *Cold temperate zone*: Alpine areas in SE. New South Wales and E. Victoria; highlands and S. and W. areas of Tasmania; and the islands off S. Tasmania.

West Gippsland, as defined for the 1969 Royal Society of Victoria Symposium, includes the following local government areas (Arnold 1969): the shires of Berwick, Cranbourne, Hastings, Flinders, Bass, Phillip Island, Korumburra, Warragul, Buln Buln, Narracan, Morwell, Mirboo, Woorayl, South Gippsland, Alberton, Traralgon, Rosedale and Maffra, the borough of Wonthaggi; and the cities of Moe, Yallourn, Traralgon and Sale. The border of West Gippsland as defined by the outermost boundaries of these local government areas is irregular and highly indented. For this reason, an arbitrary border consisting of a series of straight lines running through the towns of Mornington, Dandenong, Warburton, Woods Point, Licola, Stratford and Seaspray, has been used in this account. The area enclosed by this line includes all the local government areas mentioned above. West Gippsland defined in this way includes part of the Eastern Highlands and all the South Gippsland Highlands, and it lies mainly in the cool temperate zone, but the warm temperate zone is represented on the Mornington Peninsula and the West and East Gippsland Plains, and the cold temperate zone is represented on Mounts Baw Baw, Erica, Selma and Useful.

Unlike East Gippsland, there is no single extensive form of vegetation in West Gippsland (Williams 1955, Wood and Williams 1960). The vegetation on the relatively dry West and East Gippsland Plains, S. Mornington Peninsula, French Island and Phillip Island (all of which average less than 30 inches of rain annually) consists mainly of temperate tussock grasslands and temperate tree savannah, both of which are very open. On the N. areas of the Mornington Peninsula, Wilsons Promontory, Yanakie Peninsula, and foothills of the South Gippsland Highlands and Eastern Highlands, average rainfall is higher (more than 30 inches per year) and the vegetation is denser, consisting of mixed coastal woodlands and dry sclerophyll forests. Above 1,000 ft in the South Gippsland Highlands and Eastern Highlands, average annual rainfall exceeds 40 inches and the climax vegetation is wet sclerophyll forest or temperate rainforest, both of which are very dense and prevent solar radiation from penetrating to the ground except where there are clearings, as along rivers and creeks, around swamps and in rocky areas. In the sub-alpine and alpine areas of the Eastern Highlands above 4,000

* School of Biological Sciences, La Trobe University, Bundoora, Victoria 3083.

ft. the average annual rainfall exceeds 55 inches and is suitable for the development of wet sclerophyll forest and temperate rainforest; however the increasing severity of cold with increasing altitude prevents these vegetation forms from extending above 4,500 ft. Thus climax vegetation varies from dense temperate rainforest and montane wet sclerophyll forest at the lower altitudes, to open sub-alpine woodlands, and to alpine herbfields, bogs, tussock grasslands and feldmarks. Thus the highest altitudes have the lowest environmental temperatures, but the open nature of alpine vegetation allows intense solar radiation to reach the ground in summer. In winter, snow covers the ground for up to 5 months.

Reptiles are restricted in terrestrial environments mainly by temperature as they have no true physiological control of body temperature. They must rely on environmental (external) factors for the maintenance of body temperature and for this reason, reptiles are said to be *ectothermic*. Only birds and mammals have true physiological (internal) control of body temperature, and they are said to be *endothermic*. Although they lack internal control of body temperature, all reptile species have innate (inherited) behaviour patterns which cause them to select the most favourable environmental conditions. During activity, reptiles select conditions which enable them to maintain relatively constant body temperatures, and they can be divided into two groups depending on the method they use:

1. *Heliotherms*: (basking reptiles): use the energy in solar radiation to elevate body temperature; thus they can remain active in low environmental temperatures if they have access to sunshine.
2. *Thigmotherms* (non-basking reptiles): simply select out suitable temperatures in shaded situations; thus they are limited directly by environmental temperatures.

When environmental conditions become unfavourable (either too hot or too cold) reptiles seek out a suitable microenvironment, such as under a rock or a log, and remain inactive until conditions become favourable once more.

REPTILIAN FAUNA

Twenty-three of the twenty-nine reptile species known to occur in West Gippsland are heliotherms, and they are most abundant in areas where solar radiation can penetrate to the ground such as the temperate tussock grasslands and tree savannah, mixed coastal woodlands, sub-alpine and alpine woodlands, grasslands, bogs and feldmarks, or in clearings in the temperate rainforest and the wet and dry sclerophyll forests. Of the six thigmothermic species, two (*Denisonia flagellum* and *D. nigrescens*) are nocturnal, and the other four are fossorial litter inhabitants (*Leiolopisma delicata* and *L. mustelinum* in forest clearings at low altitudes, *Lerista bougainvilli* under rocks in grasslands and woodlands, and *Anotis maccoyi* in the wet sclerophyll forests at the higher altitudes). As is the case in East Gippsland, only one species (*A. maccoyi*) lives in the wet sclerophyll forests, and the thigmothermic reptile families Gekkonidae, Pygopodidae and Typhlopidae, which are well represented in the warmer parts of Australia, are absent.

Three of the four known SE. Australian reptilian species complexes (Rawlinson 1969 and unpublished) are represented in West Gippsland, the *Sphenomorphus quoyi* and *Notechis scutatus* complexes by one taxon each, and the *Denisonia superba* complex by two taxa. These complexes were discussed in detail under the relevant species headings in the account of the reptile fauna of East Gippsland (Rawlinson 1969).

In the following locality records for West Gippsland, data for each species are presented under four headings:

1. *Specimens examined*: includes the localities of all specimens examined in the collections of the University of Melbourne Zoology Department (*MUZD*) and the National Museum of Victoria (*NMV*).

2. *Specimens observed*: includes the author's field records of all reptiles seen but not collected. Road casualties are designated by *DOR* (dead on road).

3. *Literature Records*: includes all known literature records for West Gippsland.

4. *Distribution*: gives the general distribution of the species based on the author's collecting in SE. Australia and reliable literature records.

Recently published work on the higher taxa of skinks (Fuhn 1967, 1969; Greer 1967; Storr 1964) has enabled a revised taxonomic scheme to be adopted here (c.f. Rawlinson 1969). This scheme is based on Mittleman's (1952) revision of the family Scincidae which splits the Australian species into two sub-families, the Lygosominae and Scincinae. The West Gippsland skink species are listed below under the appropriate sub-families. Mittleman's (op. cit.) work involved a generic revision of the sub-family Lygosominae and his scheme has been adopted here except where there have been recent revisions: following Clarke (1965) the genus *Lampropholis* is not recognized; Fuhn's (1967) genus *Pseudemoia* is adopted as Mittleman (op. cit.) did not list the single species (*P. spenceri*) contained in it; and

the generic changes of Storr (1964), Greer (1967) and Fuhn (1969) are also adopted. These revisions result in the following generic changes from those used in the account of East Gippsland reptiles (Rawlinson 1969):
Siaphos maccoyi changes to *Anotis maccoyi; Rhodona bougainvilli* changes to *Lerista bougainvilli; Emoia spenceri* changes to *Pseudemoia spenceri.*

Although Worrell (1958, 1960, 1961, 1963a, 1963b, 1963c) has published a generic revision of the Australian snakes in the family Elapidae, his changes have gained little support (Rawlinson 1965, 1966, 1967, 1969; Cogger 1967). Recent work by Storr (1967) and McDowell (1969) has failed to support some of Worrell's generic changes, so the older, accepted, generic names used by Kinghorn (1956) are retained here. To standardize spelling and taxonomy of the higher groups (families, sub-orders and orders) the classification of Romer (1956) is used.

CHELONIA
CHELYIDAE

Chelodina Fitzinger 1826
Chelodina longicollis (Shaw 1793)

SPECIMENS EXAMINED: (*MUZD*) 8 mls. N. of Sale (1): (*NMV*) Nil.
SPECIMENS OBSERVED: Sale (2).
LITERATURE RECORDS: 12 mls. from Maffra; Rivers of South Gippsland (McCoy 1885).
DISTRIBUTION: Coastally from the Tropic of Capricorn southwards to Sale region, Victoria. Also occurs throughout the Murray-Darling River system, extending from this system into SW. Victoria and SE. South Australia via the Grampians Range.

SQUAMATA
LACERTILIA
AGAMIDAE

Amphibolurus Wagler 1830
Amphibolurus diemensis (Gray 1841)

SPECIMENS EXAMINED: (*MUZD*) Nil. (*NMV*) Nil.
SPECIMENS OBSERVED: Yallourn North (1).
LITERATURE RECORDS: Walhalla (Lucas & Frost 1894).
DISTRIBUTION: Highlands of W., Central and E. Victoria and SE. New South Wales from the Grampians Range (Vic.) to the Blue Mountains (N.S.W.). Also occurs on Flinders Island and in Tasmania.

Amphiborurus muricatus (Shaw 1790)

SPECIMENS EXAMINED: (*MUZD*) Shoreham (1); French Island (1). (*NMV*) Upper Yarra (2).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Upper Yarra (Lucas & Frost 1894).
DISTRIBUTION: SE. Australia from about the Queensland border southward along the coastal and inland margins of the Eastern Highlands. Also occurs in SE. South Australia.

Physignathus Cuvier 1829
Physignathus lesueuri (Gray 1831)

SPECIMENS EXAMINED: (*MUZD*) Coopers Ck., 10 mls. S. of Walhalla (1). (*NMV*) Barkly R., 3½ mls. S. of Glencairn (1).
SPECIMENS OBSERVED: Glenmaggie Reservoir (5); Thomson R., Walhalla (10).
LITERATURE RECORDS: Aberfeldy (Lucas & Frost 1894).
DISTRIBUTION: E. coast of Australia from the Cape York Peninsula (Qld.) to Walhalla in SE. Victoria. The Gippsland form has been described as a subspecies, *P. lesueuri howitti* (McCoy 1878).

SCINCIDAE
LYGOSOMINAE

Anotis Bavay 1896
Anotis maccoyi (Lucas & Frost 1894)

SPECIMENS EXAMINED: (*MUZD*) Oaks Plain, 2 mls. S. of Kel Junction (1); 5 mls. N. of Loch Valley Camp (1); Pennys Saddle, 4½ mls. N. of Loch Valley Camp (2); 4 mls. ENE. of Powelltown (1); 3 mls. E. of Powelltown (1); Kalorama (3); 1½ mls. W. of Kallista (3); 2 mls. S. of Belgrave (4); Dewhurst, 8 mls. N. of Berwick (1); 4 mls. WNW. of Upper Pakenham (2); Upper Beaconsfield (2); 5 mls. SW. of Walhalla (1); 4 mls. SSE. of Walhalla (1); 1½ mls. E. of Warragul (2); Delburn (5); 2 mls. SE. of Darlimurla (1); Shoreham (4); Mt. Oberon, Wilsons Promontory (1); Roaring Meg Ck., Wilsons Promontory (5). (*NMV*) Kallista (2); Ferntree Gully (8); 6½ mls. SW. of Powelltown (1); 5 mls. SSE. of Powelltown (8); Noojee (2); Neerim North (2); Emerald (13); Cockatoo (2); Walhalla (7); Dandenong (2); Bunyip (3); Brandy Creek (2); Trafalgar (1); Narracan (4); Meeniyan (3); Toora (4); South Gippsland (1); Waterloo, Gippsland (15).
SPECIMENS OBSERVED: Aberfeldy (1).
LITERATURE RECORDS: Walhalla; Millgrove; Mt. Dandenong (Loveridge 1934 as *Siaphos maccoyi*); Brandy Creek; Trafalgar; Waterloo; Ferntree Gully; Fernshaw; Dandenong Ranges; Berwick; Upper Yarra; South Gippsland (Lucas & Frost 1894 as *Siaphos maccoyi*).
DISTRIBUTION: Highlands of SE. New South Wales and E. Gippsland from Bulls Head, Brindabella Ranges (A.C.T.) south, then extending into W. Gippsland and SW. Victoria along the forested coastal plains and southern slopes of the Eastern Highlands.

Leiolopisma Dumeril & Bibron 1839
Leiolopisma delicata (DeVis 1888)

SPECIMENS EXAMINED: (*MUZD*) 2 mls. S. of Belgrave (1); Upper Beaconsfield (5); Heyfield (1); 4½ mls. NNW. of Pakenham (4); 4 mls. N. of Bunyip (1). (*NMV*) 1½ mls. N. of Boneo (3).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Nil.
DISTRIBUTION: E. coast of Australia from SE. Queensland southward to just E. of Melbourne, then disjunctly in SW. Victoria, SE. South Australia, Eyre Peninsula, South Australia and in NE. Tasmania.

Leiolopisma entrecasteauxi (Dumeril & Bibron 1839)

SPECIMENS EXAMINED: (*MUZD*) 10 mls. SE. of Cumberland Junction (1); Oaks Plain, 2 mls. S. of Kel Junction (2); 4 mls. S. of Kel Junction (1); 5 mls. S. of Kel Junction (2); 6 mls. S. of Kel Junction (1); 5 mls. NE. of Loch Valley Camp (4); Mt. Dandenong (1); Mt. Baw Baw summit (25); Smiths Beach, Phillip Island (1); Cape Woolamai, Phillip Island (3); 2½ mls. N. of Darby River, Wilsons Promonotory (1). (*NMV*) Mt. Baw Baw (36); Western Port (1); Meeniyan (1); Wilsons Promontory (1).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Tynong; Mt. Baw Baw (Lucas & Frost 1894).
DISTRIBUTION: Southward along the Eastern Highlands from Mt. Barrington (N.S.W.), extending onto the coastal plains in S. Victoria and SE. South Australia. Also occurs on Pearson Island, Investigator Group and Kangaroo Island off South Australia; on the Bass Strait islands; and in Tasmania where it is restricted to the N. and E. grasslands and woodlands.

Leiolopisma guichenoti (Dumeril & Bibron 1839)

SPECIMENS EXAMINED: (*MUZD*) Woods Point (1); Millgrove (2); Warburton (1); East Warburton (3); Gilderoy (1); Kallista (1); 2 mls. S. of Belgrave (4); 1½ mls. ESE. of Lysterfield (1); Dewhurst, 8 mls. N. of Berwick (4); Upper Beaconsfield (5); 4½ mls. NNW. of Pakenham (1); Lyndhurst (1); Boola Boola Camp, 3 mls. E. of Moondarra Reservoir (1); 4 mls. N.W. of Tyers (1); 3½ mls. N. of Tyers (2); 3 mls. N. of Tyers (1); 1½ mls. E. of Warragul (2); Delburn (5); 3 mls. SE. of Darlimula (1); Carrajung (1); 9½ mls. WNW. of Yarram (1); Smiths Beach, Phillip Island (2); Bruthen Ck., Woodside (1); Cape Woolamai, Phillip Island (3); 9 mls. E. of Welshpool (1); 8 mls. S. of Fish Creek (1); Shallow Inlet (1); 9 mls. N. of Darby River, Wilsons Promontory (1); 3 mls. N. of Darby River, Wilsons Promontory (2); Tidal River, Wilsons Promontory (1). (*NMV*) Upper Yarra (1); Monbulk (2); Belgrave (1); Emerald (7); Springvale (1); Cockatoo (1); Walhalla (7); Bunyip (2); Narracan (1); Yarragon (1); Loch (1); Giffard (2); Meeniyan (1); Wilsons Promontory (1).
SPECIMENS OBSERVED: 8½ mls. W. of Stradbroke (10).
LITERATURE RECORDS: Upper Yarra; Loch; Beaconsfield; Ferntree Gully; Carrum (Lucas & Frost 1894).
DISTRIBUTION: SE. Australia generally, from the coast inland to about the 20 inch isohyet. On the E. coast *L. guichenoti* does not extend much further north than Brisbane, and it is absent from the highlands in SE. New South Wales and Victoria. In South Australia, known only from the Mt. Lofty Ranges and Kangaroo Island.

Leiolopisma metallicum (O'Shaughnessy 1874)

SPECIMENS EXAMINED: (*MUZD*) 5 mls. SW. of Kel Junction (1); 2 mls. S. of Kel Junction (1); 4 mls. S. of Kel Junction (1); 6 mls. S. of Kel Junction (4); 11½ mls. S. of Kel Junction (1); 4 mls. NNW. of Mt. Whitelaw (1); Pennys Saddle, 4½ mls. NE. of Loch Valley Camp (1); 3 mls. E. of Pennys Saddle (3); 3½ mls. E. of Pennys Saddle (1); 4½ mls. E. of Pennys Saddle (2); Mt. Baw Baw summit (1); 1 ml. N. of Mt. Erica (1); 4½ mls. NNW. of Pakenham (1); Shoreham (2); Smiths Beach, Phillip Island (7); Cape Woolamai, Phillip Island (3); Waratah, Waratah Bay (1); 2 mls. N. of Walkerville (2); Benison Island, Corner Inlet (4); 2½ mls. N. of Darby River, Wilsons Promontory (9); Darby River, Wilsons Promontory (3); 2 mls. S. of Darby River, Wilsons Promontory (1); Mt. Oberon, Wilsons Promontory (1); 2 mls. SSE. of Tidal River, Wilsons Promontory (1); 5 mls. SSE of Tidal River, Wilsons Promontory (1). *Localities outside West Gippsland*: Kalatha Camp (3); Mt. Tanglefoot (3); Toolangi (1); 2 mls. NE. of Mt. St. Leonard (3); Mt. St. Leonard (9); 1½ mls. E. of Mt. St. Leonard (5); Pantons Gap, 7 mls. SE. of Healesville (1); Don Gap, 10 mls. ESE. of Healesville (1); Mud Island, Port Phillip Bay (8); Barwon Heads (1); (*NMV*) Upper Yarra (1); Mt. Baw Baw (1); 1 ml. from summit of Mt. Baw Baw (1); 6½ mls. SW. of Powelltown (10); 5 mls. SSE. of Powelltown (1); Mulgrave (7); Dandenong (1); Pakenham (4); Bunyip (1); Loch (5); Waterloo, Gippsland (1); Wilsons Promontory (2); Rodondo Island (2); Cliffy Island (3).
SPECIMENS OBSERVED: Aberfeldy (1); 3½ mls. SE. of Powelltown (1); 8 mls. NW. of Yarram (1); Roaring Meg Ck., Wilsons Promontory (1).
LITERATURE RECOROS: Black Rock; Mt. Baw Baw (Clarke 1965); Port Albert (Lucas & Frost 1894).
DISTRIBUTION: Known only from West Gippsland, the E. side of Port Phillip Bay and the Barwon Heads area on the Australian mainland; all known localities are listed above. Also known from most of the Bass Strait islands and on the Tasmanian mainland where it is the commonest species of lizard.

Leiolopisma mustelinum (O'Shaughnessy 1874)

SPECIMENS EXAMINED: (*MUZD*) Dewhurst, 8 mls N. of Berwick (2); Upper Beaconsfield (1); 1½ mls NNW. of Officer (1); Delburn (2); Dromana (1) Point Leo (1). (*NMV*) 2 mls. E. of Longford (2) Trafalgar (1).
SPECIMENS OBSERVED: Jindivick (1).
LITERATURE RECORDS: Mulgrave; Dandenong Ranges Upper Yarra; Waterloo; Ferntree Gully (Lucas & Frost 1894).
DISTRIBUTION: SE. coast of Australia from Mt. Barrington (N.S.W.) to just E. of Melbourne, with an isolate in the Otway Ranges (W. Vic.).

Leiolopisma trilineatum (Gray 1839)

SPECIMENS EXAMINED: (*MUZD*) Upper Beaconsfield (1); Cross Ck., 1 ml. W. of Stratford (1) Shoreham (2); 3 mls. N. of Darby River, Wilsons Promontory (3); 2½ mls. N. of Darby River, Wilsons Promontory (2); Tidal River, Wilsons Promontory (1). (*NMV*) Bena (1); Wilsons Promontory (1) Cape Schanck (1).

SPECIMENS OBSERVED: 1½ mls. ESE. of Lysterfield (1 *DOR*).
LITERATURE RECORDS: Brandy Creek; Western Port; Carrum (Lucas & Frost 1894).
DISTRIBUTION: Coastal and inland margins of the Eastern Highlands in SE. Australia from about the Warrumbungle Ranges (N.S.W.) south. Also occurs in SW. Australia, SE. South Australia, Kangaroo Island, the Bass Strait islands and the coastal regions of N. and E. Tasmania.

Leiolopisma weekesae? Kinghorn 1929

SPECIMENS EXAMINED: (*MUZD*) 4 mls. S. of Kel Junction (1); Kalorama (13); Belgrave (1). (*NMV*) Mt. Baw Baw (1); 2½ mls. from summit of Mt. Baw Baw (2); 3 mls. from summit of Mt. Baw Baw (1); Waterloo, Gippsland (2).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Sherbrook Forest; Mt. Donna Buang (Loveridge 1934 as *L. aeneum?*).
DISTRIBUTION: Highlands of SE. New South Wales and Victoria from the Jenolan area, Blue Mountains (N.S.W.) to the Grampians Range (Vic.), with an isolate in the Otway Ranges (W. Vic.).

Lerista Bell 1883
Lerista bougainvilli (Gray 1839)

SPECIMENS EXAMINED: (*MUZD*) *Locality outside West Gippsland*: 1 ml. NNW. of Taberabbera (1). (*NMV*) *Locality outside West Gippsland*: Springvale (1).
SPECIMENS OBSERVED: Arthurs Seat, Dromana (2).
LITERATURE RECORDS: Carrum (Lucas & Frost 1894).
DISTRIBUTION: SE. South Australia, Kangaroo Island, Victoria, E. Bass Strait islands and NE. Tasmania.

Pseudemoia Fuhn 1967
Pseudemoia spenceri (Lucas & Frost 1894)

SPECIMENS EXAMINED: (*MUZD*) Kalorama (2); 9 mls. NE. of Loch Valley Camp (41); 8 mls. NE. of Loch Valley Camp (1); 7½ mls. NE. of Loch Valley Camp (13); Mt. Baw Baw summit (1). (*NMV*) Mt. Baw Baw (1); 2½ mls. from summit of Mt. Baw Baw (11); 3 mls. from summit of Mt. Baw Baw (1); Brandy Creek (1); Narracan (1); Meeniyan (1).
SPECIMENS OBSERVED: Tarra Valley (1).
LITERATURE RECORDS: Mt. Baw Baw, 5,000′, near summit; Brady (= Brandy) Creek; Dandenong Ranges (Fuhn 1967); Brandy Creek; Dandenong Ranges (Lucas & Frost 1894 as *Emoia spenceri*); Brandy Creek; Dandenong Ranges (Worrell 1963a as *Emoia* (?) *spenceri*).
DISTRIBUTION: Highlands of SE. New South Wales and E. Victoria from the Jenolan area, Blue Mountains (N.S.W.) to Lake Mountain (Vic.), with an isolate in the Otway Ranges (W. Vic.).

Sphenomorphus Fitzinger 1843
Sphenomorphus tympanum (Lonnberg & Andersson 1913)

Cool Temperate Form

SPECIMENS EXAMINED: (*MUZD*) 4 mls. ENE. of Licola (1); 7 mls. ENE. of Kel Junction (1); 6 mls. ENE. of Kel Junction (1); 1 ml. NE. of Kel Junction (2); 10 mls. SE. of Cumberland Junction (2); Kel Junction (6); 13 mls. SE. of Cumberland Junction (1); 5 mls. WSW. of Kel Junction (1); Oaks Plain, 2 mls. S. of Kel Junction (4); 4 mls. NNW. of Mt. Whitelaw (12); 11 mls. S. of Kel Junction (6); Mt. Whitelaw (4); 9 mls. ENE. of Loch Valley Camp (6); 8 mls. ENE. of Loch Valley Camp (5); 7½ mls. ENE. of Loch Valley Camp (7); 5 mls. NE. of Loch Valley Camp (5); Pennys Saddle, 4½ mls. NE. of Loch Valley Camp (7); 5 mls. NE. of Powelltown (1); Mt. Baw Baw Plateau (3); Mt. Baw Baw summit (7); 2 mls. SW. of Mt. Baw Baw (3); 1 ml. N. of Mt. Erica (1); Kalorama (7); 5½ mls. SSE. of Walhalla (5); 5 mls. S. of Walhalla (1); 7 mls. ESE. of Walhalla (5); 5 mls. W. of Cowwarr (1); 3 mls. NW. of Boola Boola Camp (4); 4 mls. NNW. of Tyers (3); 3½ mls. NNW. of Tyers (2); 3 mls. NNW. of Tyers (4); 2 mls. E. of Buln Buln (1); Merrimans Ck., ½ ml. NE. of Stradbroke (2); Delburn (1); Monkey Ck., 2 mls. SSW. of Stradbroke (1); Causeway Rd., French Island (1); 8½ mls. SSW. of Stradbroke (4); Shoreham (1); 7½ mls. N. of Yarram (1); 8 mls. S. of Fish Creek (2); Shallow Inlet Rd. (1); N. end of Verekers Range, Wilsons Promomontory (1); 1 ml. N. of Darby River, Wilsons Promontory (3); Darby River, Wilsons Promontory (7); 2 mls. S. of Darby River, Wilsons Promontory (3); Lilly Pilly Gully, Wilsons Promontory (2); Mt. Oberon, Wilsons Promontory (4); Lighthouse Track, Wilsons Promontory (1); Roaring Meg Ck., Wilsons Promontory (3). (*NMV*) Upper Yarra (5); Mt. Baw Baw (5); 1 ml. from summit of Mt. Baw Baw (1); 2½ mls. from summit of Mt. Baw Baw (3); Junction of Tanjil Bren, Erica and Mt. Baw Baw roads (2); Ferntree Gully (1); 6½ mls. SW. of Powelltown (8); 5 mls. SSE. of Powelltown (3); Walhalla (5); Bunyip (2); Korumburra (10); Jumbunna (1); Wilsons Promontory (2).
SPECIMENS OBSERVED: 3½ mls. SSE. of Powelltown (1); Seven Acre Rock, 7 mls. SW. of Powelltown (1).
LITERATURE RECORDS: Upper Yarra; Toora (Lucas & Frost 1894 as *Lygosoma* (*Hinulia*) *quoyi*); Dandenong Ranges near Melbourne (McCoy 1890 as *Hinulia quoyi*).
DISTRIBUTION: *Cool Temperate Form*: Highlands of SE. New South Wales and Victoria from the Jenolan area, Blue Mountains (N.S.W.) southward. Occurs throughout the Victorian coastal plains from Stradbroke (W. Gippsland) to Mt. Richmond (SW. Victoria). *Warm Temperate Form*: Highlands of NE. New South Wales, coastal and inland margins of the Eastern Highlands in SE. New South Wales and NE. and SE. Victoria. Also occurs on the Fleurieu Peninsula, South Australia.

SCINCINAE

Egernia Gray 1838
Egernia luctuosa (Gray 1832)

SPECIMENS EXAMINED: (*MUZD*) *Locality outside West Gippsland*: 10 mls. SSW. of Mallacoota (1). (*NMV*) Rosedale (3).

SPECIMENS OBSERVED: 1½ mls. N. of Boneo (1).
LITERATURE RECORDS: Nil.
DISTRIBUTION: S. Western Australia, South Australia, New South Wales and six localities in Victoria, Ballarat area, Warrnambool area, Rosedale area, Mallacoota area, Kentbruck area and Boneo area.

Egernia saxatilis Cogger 1960

SPECIMENS EXAMINED: (*MUZD*) The Gurdies, 8 mls. S. of Lang Lang (1). (*NMV*) Upper Yarra (3); Pakenham (1); Trafalgar (1).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Warburton area (Cogger 1960) Upper Yarra; Gembrook; Tynong (Lucas & Frost 1894 as *E. striolata*).
DISTRIBUTION: Rocky outcrops along the Eastern Highlands from SE. Queensland to the Grampians Range in W. Victoria. The Gippsland form fits Cogger's (1960) subspecies *E. saxatilis intermedia.*

Egernia whitei (Lacepede 1804)

SPECIMENS EXAMINED: (*MUZD*) Cape Woolamai, Phillip Island (26); 2½ mls. N. of Darby River, Wilsons Promontory (11). (*NMV*) Rosedale (2); Schnapper Point (2); Cape Schanck (5).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Upper Yarra (Lucas & Frost 1894); Rosedale; Wilsons Promontory; Schnapper Point; Upper Yarra; Mt. Dandenong (Storr 1968 as *E. whitei tenebrosa*).
DISTRIBUTION: Coastal regions and highlands of SE. Australia from Eidsvold (Qld.) to SE. South Australia, Kangaroo Island, and the Yorke and Eyre Peninsulas (S.A.). Also occurs in Tasmania and the Bass Strait islands.

Tiliqua Gray 1825

Tiliqua nigrolutea (Quoy & Gaimard 1824)

SPECIMENS EXAMINED: (*MUZD*) East Warburton (3); Montrose (2); Kalorama (2); The Basin, Dandenong Ranges (2); Shady Creek, N. of Warragul (1); 16 mls. NW. of Korumburra (1); 15 mls. NW. of Korumburra (1); French Island (1); Darlimurla (1); Shoreham (1); Ventnor, Phillip Island (1); Smiths Beach, Phillip Island (1); 12 mls. N. of Darby River, Wilsons Promontory (1); 7 mls. N. of Darby River, Wilsons Promontory (1); 2½ mls. N. of Tidal River, Wilsons Promontory (1); Tidal River, Wilsons Promontory (1). (*NMV*) Yarra Junction (1); Flinders (1).
SPECIMENS OBSERVED: 8½ mls. S. of Cumberland Junction (1 *DOR*); 3 mls. NE. of East Warburton (1 *DOR*); Kilsyth (1 *DOR*); Gilderoy (1 *DOR*); Powelltown (1 *DOR*); 10½ mls. ENE. of Noojee (1 *DOR*); 1 ml. W. of Noojee (1 *DOR*); 2½ mls. E. of Noojee (1 *DOR*); 2½ mls. SW. of Noojee (1 *DOR*); 1½ mls. NE. of Necrim Junction (1 *DOR*); 1 ml. NE. of Neerim Junction (1 *DOR*); ½ ml. NE. of Neerim Junction (1 *DOR*); Keysborough (1 *DOR*); Upper Beaconsfield (2); Upper Pakenham (1 *DOR*); 1 ml. NE. of Drouin West (1 *DOR*); Cranbourne (1 *DOR*); 1 ml. NW. of Tooradin (1 *DOR*); 5 mls. W. of Tooradin (1 *DOR*); 3 mls. E. of Tooradin (1 *DOR*); Moorooduc (2); 16½ mls. NW. of Korumburra (3 *DOR*); 13 mls. NW. of Korumburra (2 *DOR*); 1 ml. E. of Hiamdale (1 *DOR*); Sorrento (1 *DOR*); 2 mls. ENE. of Boneo (1 *DOR*); Salt Mine point, French Island (1 *DOR*); 3 mls. NNE. of Grantville (1 *DOR*); 3 mls. S. of Grantville (1 *DOR*); 1 ml. SW. of Cowes, Phillip Island (1 *DOR*); 2½ mls. W. of Rhyll, Phillip Island (1 *DOR*); 8 mls. NE. of The Blowhole, Phillip Island (1 *DOR*); 5 mls. NE. of The Blowhole, Phillip Island (2 *DOR*); 4½ mls. NE. of The Blowhole, Phillip Island (1 *DOR*); 3½ mls. NE. of the Blowhole, Phillip Island (1 *DOR*); 4 mls. W. of San Remo, Phillip Island (1 *DOR*); Cape Schank (1); 12 mls. WNW. of Foster (1 *DOR*); 10 mls. WNW. of Foster (2 *DOR*); 9 mls. WNW. of Foster (1 *DOR*); 7 mls. WNW. of Foster (1 *DOR*); 4½ mls. NW. of Foster (1 *DOR*); Foster area (5); 3½ mls. SSE. of Fish Creek (1); 7½ mls. NNW. of Yanakie (1 *DOR*); 6 mls. NNW. of Yanakie (1 *DOR*); 4½ mls. NNW. of Yanakie (1 *DOR*); 3 mls. N. of Darby River, Wilsons Promontory (1 *DOR*); Darby River, Wilsons Promontory (1); 3 mls. S. of Darby River, Wilsons Promontory (1 *DOR*); 3 mls. N. of Tidal River, Wilsons Promontory (1 *DOR*); 1½ mls. N. of Tidal River, Wilsons Promontory (1 *DOR*).
LITERATURE RECORDS: Phillip Island; Frankston (Lucas & Frost 1894).
DISTRIBUTION: Highlands of E. New South Wales and Victoria from the Blue Mountains (N.S.W.) southward, extending onto the coastal plains in W. Gippsland, SW. Victoria and SE. South Australia. Also occurs in Tasmania and the Bass Strait islands, where it is widely distributed.

Tiliqua scincoides (Shaw 1790)

SPECIMENS EXAMINED: (*MUZD*) Stratford (1). (*NMV*) Giffard (1).
SPECIMENS OBSERVED: Lysterfield (1 *DOR*); 4 mls. W. of Stratford (1 *DOR*); Rosebud (1).
LITERATURE RECORDS: Nil.
DISTRIBUTION: Occurs throughout N. and E. Australia inside the 20 inch isohyet, missing only the highland regions of SE. New South Wales and E. Victoria (including the S. Gippsland Highlands). *T. scincoides* does not occur any further W. than Adelaide and the Flinders Ranges (S.A.). Mitchell (1955) described the N. Australian form as a subspecies, *T. scincoides intermedia.*

VARANIDAE

Varanus Merrem 1820

Varanus varius (Shaw 1790)

SPECIMENS EXAMINED: (*MUZD*) Nil. (*NMV*) Launching Place (1); Bunyip (1); Mt. Martha (1).
SPECIMENS OBSERVED: Mt. Beenak, 1½ mls. SW. of Gilderoy (2); Tyers R., 7 mls. S. of Eriea (1).
LITERATURE RECORDS: Walhalla; Moe; Andersons Inlet (Lucas & Frost 1894).
DISTRIBUTION: Throughout E. Australia inside the 20 inch isohyet, extending as far W. as the Mt. Lofty

Ranges (S.A.). Does not occur in the highlands of SE. New South Wales and Victoria, or in SW. Victoria.

OPHIDIA
ELAPIDAE

Demansia Gray 1842

Demansia textilis (Dumeril & Bibron 1854)

SPECIMENS EXAMINED: (*MUZD*) Nil (*NMV*) Berringania, Upper Yarra (1).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Nil.
DISTRIBUTION: In E. Australia, *D. textilis* is common on the dry inland plains. The species also penetrates down the E. coast into E. Gippsland and through the Kilmore Gap into the SW. Victorian plains, but it is absent from the highlands of SE. New South Wales and Victoria (including the S. Gippsland Highlands). The range of the species to the W. is unknown, as the taxonomic status of W. populations of *Demansia* has not been determined.

Denisonia Krefft 1869

Denisonia coronoides (Gunther 1858)

SPECIMENS EXAMINED: (*MUZD*) East Warburton (1); Pennys Saddle, 4½ mls. NE. of Loch Valley Camp (1); Mt. Baw Baw summit (1); Kalorama (2); The Basin, Dandenong Ranges (3); Upper Beaconsfield (1); Shady Creek, N. of Warragul (1); 2 mls. W. of Frankston (1); Sorrento (1); Blairgowrie (1); 1 ml. N. of Darby River, Wilsons Promontory (1); Darby River, Wilsons Promontory (1); Tidal River, Wilsons Promontory (1); Martins Hill, Lighthouse Track, Wilsons Promontory (1); Lighthouse, Wilsons Promontory (1). (*NMV*) Upper Yarra (1); Belgrave (2); Beaconsfield (3); Glengarry (1); Yallourn (1); Olivers Hill, Frankston (1); Western Port (1); Point Nepean (1); Darby River, Wilsons Promontory (2); Wilsons Promontory (1).
SPECIMENS OBSERVED: Waratah, Waratah Bay (2); 3 mls. S. of Darby River, Wilsons Promontory (1 *DOR*).
LITERATURE RECORDS: Upper Yarra (McCoy 1878 as *Hoplocephalus coronoides*).
DISTRIBUTION: Coastal and highland regions of SE. Australia from Sydney southwards to Mt. Gambier in South Australia. Also occurs on the Bass Strait islands and Tasmania.

Denisonia flagellum (McCoy 1878)

SPECIMENS EXAMINED: (*MUZD*) Nil. (*NMV*) Mt. Martha (1).
SPECIMENS OBSERVED: Sorrento (1).
LITERATURE RECORDS: Mt. Martha (McCoy 1878 as *Hoplocephalus flagellum*).
DISTRIBUTION: Coastal and volcanic plains of S. Central and SW. Victoria, then disjunctly in the Mt. Lofty Ranges (S.A.) and the Monaro Tableland (N.S.W.).

Denisonia nigrescens (Gunther 1862)

SPECIMENS EXAMINED: (*MUZD*) Kalorama (2); Maffra (1); Berwick (5); Frankston (2); McCrae (2). (*NMV*) Belgrave (4); Mount Martha (1); South Gippsland (1).
SPECIMENS OBSERVED: Nil.
LITERATURE RECORDS: Nil.
DISTRIBUTION: Coastal region of E. Australia from Cape York (Qld.) to just E. of Melbourne.

Denisonia superba (Gunther 1858)

Highlands Form

SPECIMENS EXAMINED: (*MUZD*) Mt. Margaret, 5 mls. NE. of Licola (1); Nita Junction, 14½ mls. SE. of Cumberland Junction (1); 3 mls. SW. of McMahons Creek (1); East Warburton (1); 3 mls. E. of East Warburton (2); 4 mls. ESE. of East Warburton (1); 8 mls. ENE. of Loch Valley Camp (1); 7 mls. ENE. of Loch Valley Camp (2); 6 mls. ENE. of Loch Valley Camp (1); Loch Valley Camp (3); 3 mls. NNW. of Noojee (1); 10 mls. E. of Moondarra (1). (*NMV*) Upper Yarra (1).
SPECIMENS OBSERVED: McMahons Creek (1 *DOR*); 3½ mls. SW. of Mt. Baw Baw (1 *DOR*); 1½ mls. W. of Noojee (1 *DOR*).
LITERATURE RECORDS: Millgrove (Loveridge 1934).
DISTRIBUTION: Highlands of SE. Australia from Glen Innes, New England Tableland (N.S.W.) to Lake Mountain (Vic.). There are isolates in the Mt. Lofty Ranges and on Kangaroo Island, South Australia.

Denisonia superba (Gunther 1858)

Lowlands Form

SPECIMENS EXAMINED: (*MUZD*) The Basin, Dandenong Ranges (1); Pakenham (1); Maffra (5); Warragul (3); Ellinbank, 7 mls. S. of Warragul (3); Hazelwood Power Station (1); Mooroduc (2); Lang Lang (1); Darlimurla (1); McLeods Rd., French Island (1); Golf links, Phillip Island (1); Yarram (1); 2½ mls. N. of Welshpool (1); Darby River, Wilsons Promontory (2); Mt. Oberon, Wilsons Promontory (1); Sealers Cove Track, Wilsons Promontory (2); 4 mls. NW. of the Lighthouse, Wilsons Promontory (1). (*NMV*) Ferntree Gully (1); Mulgrave (1); Springvale (1); Gembrook (1); Berwick (1); Bunyip (6); Frankston (1); Warragul (1); Moe (1); Morwell (2); Narracan (2); Loch (2); Korumburra (2); Koala Reserve, near Rhyll, Phillip Island (1); Western Port (2); Jumbunna (3); Leongatha (1); Outtrim (5); Wilsons Promontory (1).
SPECIMENS OBSERVED: Dewhurst, 8 mls. N. of Berwick (3 *DOR*); 1 ml. SE. of Poowong (1 *DOR*); 1½ mls. SW. of Carrajung (1 *DOR*); 3 mls. SE. of Korumburra (1 *DOR*); 2 mls. NE. of Yarram (1 *DOR*); Cape Woolamai, Phillip Island (1 *DOR*); 4½ mls. NW. of Foster (1 *DOR*); Deep Ck., 3 mls. E. of Foster (1 *DOR*); 1 ml. W. of Toora (1 *DOR*).
LITERATURE RECORDS: Nil.
DISTRIBUTION: Highlands of S. Gippsland and coastal plains of W. Gippsland, SW. Victoria and SE. South Australia. This form also occurs on the Bass Strait islands and in Tasmania.

TABLE 1

DISTRIBUTION PATTERNS OF WEST GIPPSLAND REPTILE SPECIES

Species	Thermal Zones occupied in West Gippsland			Zoogeographic Distribution		
	Warm Temperate Zone	Cool Temperate Zone	Cold Temperate Zone	Exclusive Bassian	Transitional from Torresian	Transitional from Eyrean
CHELYIDAE						
Chelodina longicollis	+	–	–	–	+	–
AGAMIDAE						
Amphibolurus diemensis	–	+	+	+	–	–
A. muricatus	+	–	–	+	–	–
Physignathus lesueuri	+	–	–	–	+	–
SCINCIDAE						
LYGOSOMINAE						
Anotis maccoyi	–	+	+	+	–	–
Leiolopisma delicata	+	+	–	+	–	–
L. entrecasteauxi	–	+	+	+	–	–
L. guichenoti	+	+	–	+	–	–
L. metallicum	–	+	+	+	–	–
L. mustelinum	+	+	–	+	–	–
L. trilineatum	+	+	–	+	–	–
L. weekesae?	–	+	+	+	–	–
Lerista bougainvilli	+	+	–	+	–	–
Pseudemoia spenceri	–	+	+	+	–	–
Sphenomorphus tympanum (Cool Temperate Form)	–	+	+	+	–	–
SCINCINAE						
Egernia luctuosa	+	–	–	–	–	+
E. saxatilis	+	+	–	+	–	–
E. whitei	+	+	+	+	–	–
Tiliqua nigrolutea	–	+	–	+	–	–
T. scincoides	+	–	–	–	+	–
VARANIDAE						
Varanus varius	+	–	–	–	+	–
ELAPIDAE						
Demansia textilis	+	–	–	–	–	+
Denisonia coronoides	–	+	+	+	–	–
D. flagellum	+	–	–	+	–	–
D. nigrescens	+	–	–	–	+	–
D. superba (Highlands Form)	–	+	+	+	–	–
D. superba (Lowlands Form)	+	+	–	+	–	–
Notechis scutatus	+	+	–	+	–	–
Pseudechis porphyriacus	+	–	–	–	+	–
TOTALS	19	19	10	21	6	2

Notechis Boulenger 1896
Notechis scutatus (Peters 1861)

SPECIMENS EXAMINED: (*MUZD*) East Warburton (1); 3½ mls. S. of Tooronga Falls, near Noojee (1); Olinda (1); Maffra (1); Cranbourne (1); Moorooduc (2); Mt. Oberon, Wilsons Promontory (1); Martins Hill, Lighthouse Track, Wilsons Promontory (1); Roaring Meg Ck, Wilsons Promontory (1). (*NMV*) Upper Yarra (1); Bunyip (1); Morwell (1); Narracan (2); Western Port (2); Korumburra (1); Jumbunna (3); Outtrim (5); Meeniyan (1); Wilsons Promontory (2).

SPECIMENS OBSERVED: 3 mls. W. of Noojee (1 *DOR*); Morwell Power Station (1 *DOR*); Darby River, Wilsons Promontory (1).

LITERATURE RECORDS: Nil.

DISTRIBUTION: SE. Australia inside the 20 inch isohyet from Bunya Mountains (Qld.) to the Mt. Lofty Ranges (S.A.). A closely related species, *N. ater* occurs on Tasmania and the Bass Strait islands; the Flinders Ranges, Yorke and Eyre Peninsulas and offshore islands, South Australia; and SW. Australia (Rawlinson 1967).

Pseudechis Wagler 1830
Pseudechis porphyriacus (Shaw 1794)

SPECIMENS EXAMINED: (*MUZD*) Maffra (1); 3 mls. W. of Stratford (1). (*NMV*) 2 mls. E. of Longford (1).

SPECIMENS OBSERVED: 11½ mls. WNW. of Stratford (1 *DOR*); 3½ mls. ENE. of Stratford (1 *DOR*); mls. W. of Tyers (1 *DOR*); Longford (1 *DOR*).

LITERATURE RECORDS: Nil.
DISTRIBUTION: Coastal regions of E. Australia from Cape York (Qld.) to Morwell area (Vic.). Crosses the Eastern Highlands in Queensland and penetrates along the Murray-Darling River system into South Australia where it reaches the Mt. Lofty Ranges. Also occurs along the inland margin of the Eastern Highlands in SE. Australia, penetrating into SW. Victoria through the Kilmore Gap.

DISCUSSION

Twenty-nine reptile species are recorded from West Gippsland in this paper, eight for the first time. For each species all the known West Gippsland localities are listed, and in addition there is a brief account of the general distribution of the species. Following the discussion of similar distributional data for East Gippsland reptiles (Rawlinson 1969) the present data can be discussed along two main lines to reach separate, but related, conclusions. This is done under two headings:

1. *Main reptile distribution patterns in West Gippsland.*

2. *The West Gippsland reptile fauna in relation to Australian zoogeographic subregions.*

Also the reptile faunas of West and East Gippsland can be compared: this is done under a third heading:

3. *Comparison of the reptile faunas of West and East Gippsland.*

Finally, the reptile fauna of Gippsland can be compared to those of the E. Bass Strait islands and Tasmania to see if there are any possible postglacial elements (after Rawlinson 1967). This is done under a fourth heading:

4. *Comparison of the reptile fauna of Gippsland with those of the E. Bass Strait islands and Tasmania.*

Recent collecting in S. Victoria has revealed several inaccuracies in the account of the reptiles of East Gippsland, and the present paper provides an opportunity to correct them. Firstly, *Egernia luctuosa* has been collected from Seal Ck, 10 miles SW. of Mallacoota by Mr. J. H. Seebeck, adding another species to the East Gippsland reptile fauna and bringing the total number of species to 30. Secondly, the corrections to the earlier lists of reptiles of SE. and SW. Victoria (from Rawlinson 1967) need further modification: one species, *Denisonia flagellum*, can be added to the SE. Victorian list bringing the total number of species to 34; one species, *Morethia lineoocellatus*, can be removed from the SW. Victorian list, and five species, *Amphibolurus diemensis, Leiolopisma delicata, L. metallicum, L. mustelinum* and *Hemiergis peronii*, can be added bringing the total number of species to 34. The reptilian fauna of SE. Victoria thus includes 34 species and 29 of these are known to occur in West Gippsland, the absentees being *Hemiergis decresiensis, Sphenomorphus tympanum* (warm temperate form), *Egernia cunninghami, Tiliqua casuarinae* and *Morelia argus argus.*

1. MAIN REPTILE DISTRIBUTION PATTERNS IN WEST GIPPSLAND.

West Gippsland can be divided into three thermal zones (warm, cool and cold temperate zones, see introduction) as a consequence of the low and high altitudes and variable nature of the climax vegetation. The locality data provided above indicates that: 10 species are restricted to the warm temperate; 1 species is restricted to the cool temperate; 8 species occur in both the warm and cool temperate; 9 species occur in both the cool and cold temperate; and 1 species occurs in the warm, cool and cold temperate (see Table 1.). This analysis of West Gippsland species agrees with their distribution in East Gippsland (Rawlinson 1969).

2. THE WEST GIPPSLAND REPTILE FAUNA IN RELATION TO AUSTRALIAN ZOOGEOGRAPHIC SUBREGIONS.

On the basis of animal distribution patterns, it is possible to divide the Australian continent into zoogeographic subregions, each of which has a characteristic fauna. The main subregions correspond closely to the major climatic divisions. Spencer (1896) recognized and described three such subregions, the temperate Bassian, tropical Torresian and arid Eyrean. Serventy and Whittell (1961) added a fourth "district" (or subregion), the temperate South-Western, which has a fauna consisting of Bassian and Eyrean elements with the latter predominating. These four subregions have become generally accepted as the major zoogeographic areas in Australia (Keast 1959; Littlejohn 1967; Kluge 1968; Frith 1969; Mackerras 1970) and they are almost identical to the three principal floristic zones proposed by Burbidge (1960): the Tropical zone (= Torresian); Temperate zone (= Bassian and South-Western); and the Eremaean (= Eyrean). Gippsland lies in the Bassian zoogeographic subregion (see introduction). In the account of the reptiles of East Gippsland (Rawlinson 1969), the reptile fauna was analysed using the principles for zoogeographic regions and subregions laid down by Darlington (1957) and Keast (1959) to show it is Bassian in nature. The basis for the analysis (see Rawlinson 1969 for a detailed discussion) was that as the Bassian subregion is only

partially separated from the adjacent subregions (Eyrean and Torresian) there will be complex transitions between them. The transitions cause overlapping of faunal elements with progressive subtractions in both directions. As a result of these transitions, the taxa in the Bassian (and the other subregions) can be divided into three categories:

1. *Exclusive taxa*: occur in one region only; these taxa delimit the region.
2. *Transitional taxa*: occur in two or more regions, but are extensive in one region and limited in the others.
3. *Shared taxa*: occur throughout, or are equally extensive in, two or more regions.

Thus the West Gippsland reptile fauna could contain: taxa exclusive to the Bassian; taxa transitional to, or from, the Bassian, Eyrean and Torresian; and taxa shared between the Bassian and Eyrean or Torresian. In all, it would be possible for the West Gippsland reptile fauna to contain 12 zoogeographic elements, but Table 2 shows that only 7 of these categories are represented: 3 at the specific level; 2 at the superspecific (*sensu* Mayr 1963) level; 7 at the generic level; and 3 at the familial level.

Of the 29 species recorded from West Gippsland, 21 are exclusive to the Bassian, 6 are transitional from the Torresian and 2 are transitional from the Eyrean. These are listed in Table 1. It should be noted that the species transitional from the Torresian and Eyrean are restricted to the warm temperate zone.

At the superspecific level, there are members of 3 species complexes present in West Gippsland; 2 (the *Denisonia superba* and *Notechis scutatus* complexes) are exclusive to the Bassian; and 1 (the *Sphenomorphus quoyi* complex) is transitional from the Torresian to the Bassian.

At the generic level, the West Gippsland reptile fauna has: 2 genera exclusive to the Bassian (*Notechis and Pseudemoia*); 1 genus transitional from the Bassian to the Torresian (*Leiolopisma*); 2 genera transitional from the Torresian to the Bassian (*Chelodina* and *Anotis*); 1 genus transitional from the Eyrean to the Bassian (*Lerista*); 4 genera transitional from the Torresian and Eyrean to the Bassian (*Physignathus, Varanus, Demansia and Pseudechis*); 1 genus shared between the Bassian and Torresian (*Sphenomorphus*); and 4 genera shared between the Bassian, Torresian and Eyrean (*Amphibolurus, Egernia, Tiliqua* and *Denisonia*).

At the familial level, the West Gippsland reptile fauna has: 1 family transitional from the Torresian to the Bassian (Chelyidae); 1 family transitional from the Torresian and Eyrean to the Bassian (Varanidae); and 3 families shared between the Bassian, Torresian and Eyrean (Agamidae, Scincidae and Elapidae).

The above analysis of the West Gippsland reptile fauna reveals that it is essentially Bassian in nature, but the presence of the warm temperate zone has enabled certain transitional Torresian and Eyrean taxa to become established. As was the case for East Gippsland, the evidence presented indicates that it has been easier for Torresian taxa to become established in the area. These points are best exemplified at the specific level where 72% of the species are exclusively

TABLE 2

ZOOGEOGRAPHIC ELEMENTS PRESENT IN THE WEST GIPPSLAND REPTILE FAUNA

Possible Distribution Pattern	Number of Taxa			
	Species	Super-Species	Genera	Families
1. Exclusive Bassian	21	2	2	—
2. Transitional Bassian to Torresian	—	—	1	—
3. Transitional Bassian to Eyrean	—	—	—	—
4. Transitional Bassian to Torresian and Eyrean	—	—	—	—
5. Transitional Torresian to Bassian	6	1	2	1
6. Transitional Eyrean to Bassian	2	—	1	—
7. Transitional Torresian and Eyrean to Bassian	—	—	4	1
8. Transitional Torresian to Eyrean and Bassian	—	—	—	—
9. Transitional Eyrean to Torresian and Bassian	—	—	—	—
10. Shared Bassian and Torresian	—	—	1	—
11. Shared Bassian and Eyrean	—	—	—	—
12. Shared Bassian and Torresian and Eyrean	—	—	4	3
TOTALS	29	3	15	5

Bassian, 21% are transitional from the Torresian, and 7% are transitional from the Eyrean. The higher taxonomic categories present a less clear picture, 2 species complexes (superspecies *sensu* Mayr 1963) are exclusively Bassian, 2 genera are exclusively Bassian and 1 genus is transitional from the Bassian to the Torresian. All other taxa are transitional from, or shared with, the Torresian or Eyrean, but a stronger link to the Torresian is evident.

3. Comparison of the Reptile Faunas of West and East Gippsland.

Currently, 30 species of reptiles are known to occur in East Gippsland, and 29 species are known to occur in West Gippsland. Twenty-five species are common to both areas, thus 4 West Gippsland species are missing from East Gippsland (*Leiolopisma metallicum, Lerista bougainvilli, Denisonia flagellum* and *D. superba* lowlands form), and 5 East Gippsland species are missing from West Gippsland (*Hemiergis decresiensis, Sphenomorphus tympanum* warm temperate form, *Egernia cunninghami, Tiliqua casuarinae* and *Morelia argus argus*).

It is possible to calculate the degree of faunal resemblance between these areas using Simpson's (1965) formula:

$$\text{Percentage resemblance} = \frac{100\ C}{N_1}$$

where C stands for the number of taxonomic units (species or genera or families) common to the two faunas and N_1 is the total number of these taxonomic units in the smaller of the two faunas. West Gippsland has the smallest fauna and application of Simpson's formula reveals that the resemblance of the West Gippsland reptile fauna to that of East Gippsland is 86% at the specific level, 93% at the generic level, and 100% at the familial level.

4. Comparison of the Reptile Fauna of Gippsland With Those of the E. Bass Strait Islands and Tasmania.

Tasmania and the Bass Strait islands are separated from the Australian mainland by a continuous depth of less than 80 metres (Jennings 1959). Wilsons Promontory, the most southerly projection of the mainland, is included in West Gippsland and a chain of islands runs in a gentle curve from the Promontory to NE. Tasmania which lies 135 miles to the south. The major islands in this E. Bass Strait chain are situated in the Hogan, Kent and Furneaux Groups that lie 25, 50 and 85 miles respectively from Wilsons Promontory.

Bass Strait is shallowest along this E. chain of islands, and the maximum continuous depth of 60 metres is in a channel lying between Wilsons Promontory and the Hogan Group. Moving south the water barriers between island groups get progressively shallower and the Furneaux Group is separated from Tasmania by a maximum continuous depth of only 32 metres.

The above facts are important when considering animal distribution patterns in SE. Australia in the light of climatic and sea level changes during the Pleistocene epoch. During the Pleistocene there were four major glacial phases (the Nebraskan, Kansan, Illinoian and Wisconsin) the most recent of which was divided into two further glacial phases (the Early Wisconsin and Main Wisconsin) (Ericson and Wollin 1968). During each glacial phase, surface temperatures around the earth fell by at least 5°C. (Littlejohn 1967) and the polar ice caps and continental ice sheets were greatly expanded. The vast quantity of water locked up in ice caused a eustatic drop in sea level of 70 to 100 metres. As a result of progressive accumulation of ice in the Antarctic and Greenland ice caps and sinking of the ocean floors, mean sea level has not recovered to the same extent during succeeding interglacials and it presently stands 100 metres below the Pliocene non-glacial level. (Fairbridge 1960; Schwarzbach 1963; Zeuner 1959). Thus glacial minima in sea level have dropped steadily with succeeding glaciations and the last three glacial phases (the Illinoian, Early Wisconsin and Main Wisconsin) produced minima at least 80 metres below present sea level (Fairbridge 1960). Lowering sea level to this extent would connect Tasmania and the Bass Strait islands to the Australian mainland by a landbridge (the "Bassian isthmus"), permitting faunal interchanges at a time when the climate was at least 5°C. colder than at present. The colder climate would have an important effect on reptile movements, as temperature is the major limiting factor.

The most recent glacial eustatic lowering of sea level (during the Main Wisconsin) reached its peak 17,000 years B.P. when the sea lay 100 metres below its present level. As the glacial ice melted, sea level rose rapidly from 16,000 to about 5,000 years B.P. when the present coastline was attained. Estimates are available for the rate of rise in sea level during this time (Fairbridge 1960, 1967; Godwin, Suggate and Willis 1958; Shepard 1964) and, as the maximum depths separating the present E. Bass Strait land masses are known, it is possible to obtain times for the breakup of the Bassian landbridge with the consequent isolation of the land masses:

TABLE 3

DISTRIBUTION OF REPTILE SPECIES IN GIPPSLAND, THE E. BASS STRAIT ISLANDS AND TASMANIA

Species	Distribution				
	Gippsland	†Hogan Group	Kent Group	Furneaux Group	Tasmania
CHELYIDAE					
Chelodina longicollis	+	–	–	–	–
AGAMIDAE					
Amphibolurus diemensis	+	–	–	+	+
A. muricatus	+	–	–	–	–
Physignathus lesueuri	+	–	–	–	–
SCINCIDAE					
LYGOSOMINAE					
Anotis maccoyi	+	–	–	–	–
Hemiergis decresiensis	+	–	–	–	–
Leiolopisma delicata	+	–	–	–	+
L. entrecasteauxi	+	+	–	+	+
L. guichenoti	+	–	–	–	–
L. metallicum	+	+	+	+	+
L. mustelinum	+	–	–	–	–
L. ocellatum	–	–	–	+	+
L. pretiosum (Form A)	–	–	–	+	+
L. pretiosum (Form B)	–	–	–	–	+
L. trilineatum	+	+	+	+	+
L. weekesae?	+	–	–	–	–
Lerista bougainvilli	+	–	+	+	+
Pseudemoia spenceri	+	–	–	–	–
Sphenomorphus tympanum (Cool Temperate Form)	+	–	–	–	–
Sphenomorphus tympanum (Warm Temperate Form)	+	–	–	–	–
SCINCINAE					
Egernia cunninghami	+	–	–	–	–
E. luctuosa	+	–	–	–	–
E. saxatilis	+	–	–	–	–
E. whitei	+	+	+	+	+
Tiliqua casuarinae	+	–	–	–	+
T. nigrolutea	+	+	+	+	+
T. scincoides	+	–	–	–	–
VARANIDAE					
Varanus varius	+	–	–	–	–
BOIDAE					
Morelia argus argus	+	–	–	–	–
ELAPIDAE					
Demansia textilis	+	–	–	–	–
Denisonia coronoides	+	–	+	+	+
D. flagellum	+	–	–	–	–
D. nigrescens	+	–	–	–	–
D. superba (Lowlands Form)	+	–	–	+	+
D. superba (Highlands Form)	+	–	–	–	–
*Notechis ater	–	–	–	+	+
N. scutatus	+	–	–	–	–
Pseudechis porphyriacus	+	–	–	–	–
TOTALS	34	5	6	12	15

* This species, *Notechis ater*, does not occur in S. Victoria; however it does occur on the Australian mainland in South Australia and Western Australia (Rawlinson 1967).

† Data on the reptiles of the Hogan Group by courtesy of Mr B. S. McIntosh, Zoology Department, University of Tasmania.

Years B.P.	
17,000	Sea level 100 metres lower than at present.
16,000	Eustatic rise in sea level commenced.
12,750	Sea level 60 metres lower than present. Wilsons Promontory isolated from Hogan, Kent and Furneaux Groups and Tasmania.
10,000	Sea level 32 metres lower than at present, Furneaux Group isolated from Tasmania.

Thus Tasmania and the E. Bass Strait islands were isolated from the Australian mainland 12,750 years ago when the climate was colder. The reptile faunas of Tasmania and the Bass Strait islands then should be similar in composition to, or reliets of, the fauna occupying the landbridge area at the time of isolation. Consequently, comparison of the Gippsland reptile fauna with those of the E. Bass Strait islands and Tasmania could reveal the presence of post-glacial intrusives.

Five reptile species are known to occur in the Hogan Group, 6 species in the Kent Group and 12 species in the Furneaux Group; all these species are shared with Tasmania which has 15 species. However 3 species from the Furneaux Group are not shared with Gippsland which has 34 species (Table 3.). Thus the reptile faunas of the E. Bass Strait islands are apparently derived from the same source and they are closely allied to the present day Tasmanian reptile fauna (see also Rawlinson 1967).

Thirty-four reptile species occur in Gippsland, 5 are shared with the Hogan Group, 6 with the Kent Group, 9 with the Furneaux Group and 11 with Tasmania (Table 3.). Therefore there are 23 possible post-glacial intrusives (Rawlinson 1967), but only those found in the areas closest to the old landbridge (i.e. in the cool and cold temperate zones) can be classified as probable post-glacial intrusives, especially if they occur in the Wilsons Promontory or Cape Otway areas. Only 7 of the 23 species fit into this category, they are: *Anotis maccoyi, Leiolopisma guichenoti, L. mustelinum, L. weekesae?, Pseudemoia spencceri, Sphenomorphus tympanum* (cool temperate form) and *Notechis scutatus*. It is considered that if they showed their present distributions when the Bassian landbridge was present, they would have reached Tasmania.

The remaining 16 species occurring in Gippsland but not in Tasmania are primarily forms whose main distributions lie outside S. Victoria, and their present distributions (mainly in the warm temperate) would have excluded them from the landbridge. They may be classified as being of E. or W. origin according to whether the species has a generally E. or W. distribution (Rawlinson 1967). There are 12 such E. forms and 4 W. forms: the E. group includes *Chelodina longicollis, Amphibolurus muricatus, Physignathus lesueuri, Sphenomorphus tympanum* (warm temperate form), *Egernia cunninghami, E. saxatilis, Tiliqua scincoides, Varanus varius, Morelia argus argus, Denisonia nigrescens, D. superba* (highland form), and *Pseudechis porphyriacus;* and the W. group includes *Hemiergis decresiensis, Egernia luctuosa, Demansia textilis* and *Denisonia flagellum.*

Thus is can be seen that there has been a change in the Gippsland reptile fauna over the last 12,750 years, and 7 species (including some of the dominant present day S. Victorian species) are apparently post-glacial intrusives.

CONCLUSIONS

1. West Gippsland can be divided into three thermal zones, the warm, cool and cold temperate zones, each of which has its own reptilian fauna.

2. Following the principles for zoogeographic regions and subregions laid down by Darlington (1957) and Keast (1959), the West Gippsland reptile fauna is considered to be Bassian in nature, but the warm temperate zone has enabled transitional Torresian and Eyrean taxa to become established.

3. Using Simpson's (1965) method for assessing faunal resemblance, the West and East Gippsland reptile faunas are closely related.

4. At least 7 of the Gippsland reptile species are post-glacial intrusives.

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